



The great Indian calorie debate: Explaining rising undernourishment during India's rapid economic growth



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ARTICLE INFO

Article history:

Received 8 March 2013

Received in revised form 28 August 2014

Accepted 9 October 2014

Keywords:

Undernourishment

India

Household Consumption and Expenditure Surveys

Food consumed away from home

ABSTRACT

The prevalence of undernourishment in India – the percent of people consuming insufficient calories to meet their energy requirements – has been rising steadily since the mid 1980s. Paradoxically, this period has been one of robust poverty reduction and rapid economic growth. The reasons for the apparent reductions in calorie consumption underlying increased undernourishment have been the subject of intense debate both within India and internationally. This paper critically reviews this debate, finding that it has taken place outside of the context of India's recent nutrition and epidemiological transitions, which appear to have brought with them increased, not decreased, food consumption. The debate has also taken place under the unchallenged assumption that the data on which the conflicting trends are based, collected as part of the country's Household Consumption and Expenditure Surveys (HCESs), are reliable. The paper provides supporting literature and empirical evidence that a probable key source of the calorie decline is incomplete collection of data on food consumed away from peoples' homes, which is widespread and rapidly increasing. Complete measurement of this food source in the HCESs of all developing countries is vital for accurate measurement of both undernourishment and poverty – and for resolving the Indian calorie debate.

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Introduction

India is the home of over 1.2 billion people, now making up more than a sixth of the world's population. By 2025, it is expected to be the most populous country in the world, surpassing China (U.S. Census Bureau, 2012). Given its large population, the food and nutrition situation in India has a major influence over developing-world statistics on food insecurity, including the indicators used to gauge progress towards the Millennium Development Goals. For instance, reflecting its high prevalence of malnutrition among preschool children and sheer size, a full 42% of the world's underweight children live in India (von Grebmer et al., 2010). According to United Nations Food and Agriculture Organization (FAO) estimates, it is also the home of the largest number of undernourished people – that is, the number consuming insufficient calories to meet their energy requirements – representing one-fourth of the developing-world total (FAO, 2012a).¹

By virtue of India's prominence in influencing the achievement of global goals – but more importantly, for the sake of the millions of Indian people facing food insecurity and hunger – it is of primary importance that statistics on its food and nutrition situation give accurate guidance to policy makers working to improve that situation.

An important source of data on which estimates of undernourishment in India are based is the country's Household Consumption and Expenditure Surveys (HCESs) conducted by the National Sample Survey Organization (NSSO). Fig. 1 reports undernourishment prevalences derived from HCESs conducted between 1988 and 2005. For comparison, World Bank estimates of poverty, that is, the percent of people living on less than \$1.25 per day, derived from the same surveys are also reported. Undernourishment shows a steadily increasing trend over the period, rising from 25% in 1988 to 34 in 2005, a nine percentage-point increase. By contrast, poverty shows a robust declining trend, falling 12 percentage points. Underlying rising undernourishment estimates is a steady decline in estimated calorie consumption per capita found in both rural and urban areas.²

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¹ FAO estimates of undernourishment published in its annual *State of Food Insecurity in the World* (FAO, 2012a) are currently based on food supply data from Food Balance Sheets as well as supplementary information on distribution obtained from countries' Household Consumption and Expenditure Surveys. Thus they are not comparable to those presented in this paper.

² Between 1987/88 and 2009/10 measured calorie consumption per capita fell by 10.3 percent (from 2252 to 2020 kcals) in rural India and by 7.2% (from 2098 to 2026) in urban India (see Fig. 1 for data sources).

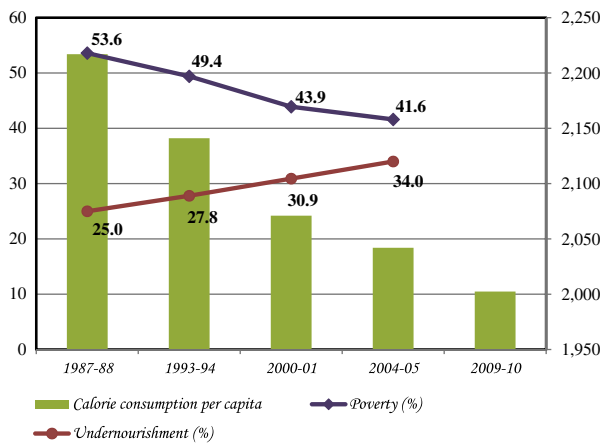


Fig. 1. Trends in estimates of poverty, undernourishment, and calorie consumption from India's Household Consumption And Expenditure Surveys, 1988–2010. Note: Estimates of poverty and undernourishment for 2009–10 are not yet available. Sources: Poverty estimates: World Bank (2010). Undernourishment estimates for 1993–94, 2000–01 and 2004–05: NSSO survey rounds 50, 56 and 61 and reported in Chattapadhyay and Chowdhury (2010); Estimate for 1987–88: from NSSO survey round 43, author's calculation. Calorie consumption: FAO (2010a) for years prior to 2009–10; NSSO (2012) for 2009–10.

What explains these anomalous trends? The decline in poverty over the 17-year period, which was one of rapid economic growth, is to be expected. But why would calorie consumption fall and, most worrisome, undernourishment go up when incomes are rising? Further puzzling is that measured calorie consumption has fallen the most for the wealthiest segment of the population, whose incomes are increasing the fastest (Deaton and Drèze, 2009) and for whom overweight and diet-related non-communicable disease prevalences are the highest (Gaiha et al., 2010).

Partly due to the magnitude of food insecurity problems in India and partly to the degree of their incongruity, trends in poverty and calorie consumption in the country have been the subject of intense discussion and debate for a long time. The participants in the debate include government officials, private and non-profit think tanks, journalists, and academics within India, with more involvement internationally since the 1990s when the NSSO data became accessible to non-government analysts (see Deaton and Kozel, 2005 on the Great Indian Poverty Debate). In 2009 Deaton and Drèze (2009) provided an extensive review of the available evidence in their widely-cited article "Food and nutrition in India: Facts and interpretations". In the wake of this paper's publication the crossfire heated up, with the latest round published in India's *Economic and Political Weekly* including accusations of "calorie fundamentalism" and "fatal fallacies" (Patnaik, 2010a,b; Deaton and Drèze, 2010a,b).

This paper brings a new perspective by placing the debate into the wider context of India's recent economic, nutrition and epidemiological transitions and appraising the underlying data used to measure calorie consumption. It starts with a review of previous explanations given for the anomalous trends in poverty and calorie consumption. It then describes the highly dynamic context in which the food and nutrition situation in India has evolved in recent years. Examination of this context in turn leads to exploration of a key measurement issue: the quality of data collected on food consumed away from home in India's HCESs. HCES survey data are used to analyze how this source of food has changed over time and whether it is included in estimates of calorie consumption. The analysis follows on an extensive joint FAO–NSSO review of calorie consumption and undernourishment computations from

recent HCESs (FAO, 2010). The resulting estimates, reported in Chattapadhyay and Chowdhury (2010), and the underlying processed data from surveys conducted in 1987/88, 1993/94, 1999/2000, 2000/01 and 2004/05³ are the main data base employed. Supplementary information from the 2009/10 HCES and 2005 India Human Development Survey is also relied on. Before concluding, a cross-country analysis of the importance of the quality of data collected on food consumed away from home for estimates of calorie consumption is undertaken.

The debate over the causes of declining calorie consumption in India: a critical review

A number of explanations have been proposed for the measured declines in calorie consumption in India in the face of rising incomes. One explanation, mentioned earlier in Rao (2000) and Palmer-Jones (2005) and given recent prominence in Deaton and Drèze (2009), is that they are rooted in falling calorie requirements. The hypothesis is that increased mechanization of agricultural and domestic technologies and of transport have reduced physical activity, leading to a reduction in the energy required by the average Indian.⁴ The reasoning is that people have voluntarily reduced their calorie consumption even as their incomes have increased because they need less food. The calorie requirements hypothesis is used to explain the pattern of downward shifting calorie Engle curves⁵ over time using data from successive HCESs (Deaton and Drèze, 2009).

It is intuitively plausible and well-accepted among nutritionists that calorie consumption is positively correlated with calorie requirements (Institute of Medicine, 2000; Mason, 2002). Further, there is no doubt that there have been declines in physical activity over time in India, although current evidence suggests that this decline is slow in comparison with the experience of other countries undergoing strong economic growth.⁶ However, calorie requirements depend not only on energy expenditure, but also on age, sex, body composition and body size (UNU, WHO and FAO, 2004). While actual energy requirements of individuals based on all these factors have not been estimated for the Indian population, FAO reports national per-capita requirements derived from age, sex and height data and assuming a constant "light" physical activity level (FAO, 2012b). Over the 20-year period from 1992 to 2012, this requirement increased by close to 100 kcals, from 2163 to 2258.⁷ The increase is associated with the aging of the population (an increased proportion of adults, who are taller and heavier) and

³ The NSSO survey data are collected using multi-stage stratified random sampling, with the strata being urban and rural areas within each of India's States or Union Territories (Chattapadhyay and Chowdhury, 2010). The data are collected over a year's time. Those data from all survey rounds except 2000/01 are the "thick" rounds conducted more or less quinquennially in which a larger sample size (approximately 120,000 households) is taken to enhance the ability to compute statistics sub-nationally. The 56th round survey undertaken in 2000/01 is a "thin" round survey with a smaller sample size (81,488 households). The data in this latter survey were employed by Chattapadhyay and Chowdhury (2010) because the 1999/2000 thick round survey used an unusual two-period reference period rendering poverty and calorie consumption estimates non-comparable with the other rounds without complicated compensatory data manipulation (Deaton and Kozel, 2005).

⁴ Another possible factor cited for the reduction of energy requirements is health environment improvements that reduce the need for calories to recover from illness (Deaton and Drèze, 2009).

⁵ The Engle curves show the (cross-sectional) relationship between income and calorie consumption.

⁶ Evidence is presented in Ng and Popkin (2012) who, using data collected from 2000 to 2005, document slight declines in occupational, domestic, and travel-related physical activity, accompanied by no change in being sedentary.

⁷ These requirements are referred to as "average" requirements for light activity recommended by UNU, WHO and FAO (2004). "Minimum" requirements are used for FAO's calculations of undernourishment and for the estimates reported in Fig. 1.

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